

## PATENT ABSTRACTS OF JAPAN

(11)Publication number : 10-157283

(43)Date of publication of application : 16.06.1998

(51)Int.Cl.

B41M 5/00  
B05D 5/04  
// D21H 27/00

(21)Application number : 08-324213

(71)Applicant : MITSUBISHI PAPER MILLS LTD

(22)Date of filing : 04.12.1996

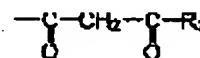
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## (54) MATERIAL TO BE RECORDED FOR INK JET

## (57)Abstract:

PROBLEM TO BE SOLVED: To provide a material to be recorded for ink jet recording without aging deterioration of discoloring with satisfactory water resistance and light resistance and excellent water resistance of a printed part by incorporating a polymerized group having a functional group represented by a specific formula on a support.

SOLUTION: The material to be recorded for ink jet comprises an ink receiving layer obtained by coating a support with solution containing polymer having functional group represented by a specific formula, where R indicates alkyl group. As the support, paper containing timber pulp as a main body, polyester film, or cellulose acetate film. The polymer having the functional group represented by the formula may solely contain the functional group of the formula or preferably contains the polymer obtained by copolymerizing other monomer copolymerizable with the monomer having the functional group of the formula.



## LEGAL STATUS

[Date of request for examination] 19.06.2003

[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]

[Patent number] 3707884

[Date of registration] 12.08.2005

[Number of appeal against examiner's decision of rejection]

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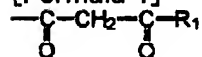
**CLAIMS**

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[Claim(s)]

[Claim 1] The ink jet recorded material characterized by including the polymer which has the functional group shown by \*\* 1 in the recorded material for ink jets which has an ink acceptance layer on a base material in an ink acceptance layer.

[Formula 1]



(R1 expresses an alkyl group among \*\* 1.)

[Claim 2] The ink jet recorded material with which the polymer which has the functional group shown by \*\* 1 in claim 1 is characterized by having the ink acceptance layer over which the bridge is constructed by the aldehyde mold cross linking agent or N-methylol mold cross linking agent.

[Claim 3] The ink jet recorded material with which the polymer which has the functional group shown by \*\* 1 in claim 1 is characterized by having the ink acceptance layer over which the bridge is constructed with the polymer which has an aldehyde group or N-methylol radical.

[Claim 4] The ink jet recorded material characterized by forming the ink acceptance layer which contains gelatin with this polymer in claim 1.

[Claim 5] The ink jet recorded material characterized by including the polymer it has a polymer and a quaternary-ammonium-salt radical or a phosphonium salt radical as a functional group further in this polymer in an ink acceptance layer in claim 1.

[Claim 6] The ink jet recorded material characterized by blending the polymer which has a quaternary-ammonium-salt radical or a phosphonium salt radical with this polymer in claim 1, and containing in an ink acceptance layer.

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[Translation done.]

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**DETAILED DESCRIPTION**

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**[Detailed Description of the Invention]****[0001]**

**[Field of the Invention]** This invention relates to the recorded material for ink jet record which especially uses paper, resin coat paper, a film, etc. as a base material about the record medium to the water color ink using an ink jet recording method.

**[0002]**

**[Description of the Prior Art]** The quality demand to a recorded material is becoming still severer in recent years with improvement in the speed of an ink jet recording device, highly-minute-izing of a record image, and full-color-izing. In current [ by which the model of engine performance which can output a high definition image until it is equal to the color picture by the conventional film photo method in image quality into the various ink jet printers currently furthermore developed for full color record is developed ] The amount of the drop driven into a recorded material front face as an ink dot in order to obtain sufficient image concentration increases increasingly. As an ink absorption capacity of a recorded material, the ink to about 20-30g of \*\*\*\*\* hits is absorbed, and by the time it is required that ink should not remain on a front face, it will become.

**[0003]** Although the approach of preparing an ink absorption layer, forming the vesicular structure by a pigment etc. into this ink absorption layer, and absorbing ink all over an opening is effective in order to absorb such a lot of ink, in the ink absorption layer by such configuration, usually the gloss on the front face of a coated layer by light scattering of a pigment falls remarkably, and deterioration of the image quality by the configuration of an ink dot being confused further may pose a problem.

**[0004]** As an attempt for having the surface gloss of extent which is equal to a film photo as an ink jet recorded material, and realizing good ink absorption capacity The \*\* which does not introduce into an ink absorption layer particles, such as a pigment which is the main factor of a fall of surface gloss, when forming an ink absorption layer, Although giving such ink absorptivity chiefly to the polymer as a binder itself is proposed, and these are used also as an OHP sheet since they are translucency For example, JP,61-19389,A, 61-277483, 61-287782, The example of the ink absorption layer which makes various nature or a synthetic polymer a subject so that JP,62-9988,A, JP,63-207681,A, JP,1-146784,A, 1-280581, a 7-323656 official report, etc. may see is indicated.

**[0005]** Although the recorded material excellent in gloss or translucency was obtained when the ink absorption layer which is mainly concerned with the above polymers was formed, the water resisting property of the polymer itself came out enough, and when there was nothing, or since the function established in the printed ink color was missing, the problem which cannot secure the water resisting property of a record image occurred. It is indicating about the approach of raising the water resisting property of a record image, without mentioning forming into a bridge formation deck watertight luminaire the polymer which constitutes an ink absorption layer as one of the most effective means for deck-watertight-luminaire-izing the ink absorption layer itself [ such ], for example, deck-watertight-luminaire-izing an ink absorption layer by cross linking agents, such as epoxy, on JP,6-340163,A specifications, and spoiling ink absorptivity.

**[0006]** thus, the absorption capacity of ink comes out enough and the demand item as a recorded material for realizing high-definition ink jet record which opposes a film photo has good a certain thing and surface gloss as much as a color paper -- in addition, to be still better also about the shelf life of

a record image is demanded. While this has the water resisting property of a record image, good lightfastness, etc., it is required that there is no degradation of discoloration etc. with the passage of time also about the non-printing section.

[0007] In the ink jet recording method using water color ink, since water soluble dye is mainly used now, unless the color material which forms the printed image does not insolubilize such water soluble dye in the printed part or fixes it in a certain form, it is difficult to realize the water resisting property of an image. Various systems have been proposed as the deck-watertight-luminaire-ized agent or fixing agent of such a color from before. for example, as an example using amines polymers, such as an amino group The example of the permutation polyethyleneimine as a mordant is indicated by JP,7-304982,A. The poly allylamine to JP,7-266689,A Moreover, JP,56-84992,A, JP,57-36692,A, JP,61-72581,A, 61-74880, Many amine system polymers are indicated that 61-27279, JP,63-264391,A, JP,64-8085,A, JP,7-290817,A, JP,7-125411,A, etc. see as a color fixing agent.

[0008] A cationic inorganic particle like the alumina sol which the example of a low-molecular phosphonium compound is indicated by JP,7-1830,A, for example, and is indicated by JP,3-215081,A, the 3-67684 official report, etc. as an inorganic system fixing agent as fixing agents other than an amine system etc. is mentioned. The example of the polymer to which the effectiveness as a mordant is conventionally found out in the field of photosensitive material, for example, the polymer which furthermore has a phosphonium salt radical in a side chain all has a phosphonium salt radical in a patent of U.S. Pat. No. 3429839, 3547649, 4855211, etc. is indicated.

[0009]

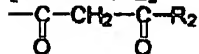
[Problem(s) to be Solved by the Invention] As mentioned above, the place which this invention makes a technical problem is excellent in the water resisting property of the printing section, and is to offer a recorded material without degradation with the passage of time, such as discoloration, while printing image quality is good, excelling in ink absorption capacity, and surface gloss's being good and the water resisting property of the ink jet recorded material before and behind printing itself, lightfastness, etc. being good. There is no system coincidence is made satisfied with the conventional technique about the item of all above of a system, and the present condition was that it is anxious for the means of solution.

[0010]

[Means for Solving the Problem] The above-mentioned purpose is attained by this invention described below. That is, it found out that a technical problem was solved with the ink jet recorded material which has the ink acceptance layer characterized by including the polymer which has the functional group shown by \*\* 2 on a base material.

[0011]

[Formula 2]



[0012] R2 expresses an alkyl group among \*\* 2. Although there is especially no limit as an alkyl group, the case of a methyl group and an ethyl group is used preferably.

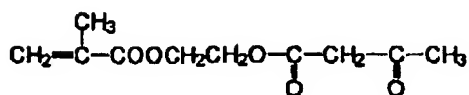
[0013]

[Embodiment of the Invention] The ink jet recorded material which has an ink acceptance layer can form fundamentally by applying the solution containing the polymer which has the above-mentioned functional group on a base material. Although what carried out the lamination of polyethylene, the polypropylene, etc. to various films, such as paper which makes wood pulp a subject as a base material and a polyester system film, and a cellulose acetate system film, or paper is mentioned, when using base materials other than a paper sheet, it is desirable to use it for it, carrying out coating to a front face.

[0014] The target polymer can be obtained by carrying out the polymerization of the monomer shown by \*\* 3 --izing 9 as one of the approaches for obtaining the polymer which has the functional group shown by \*\* 2.

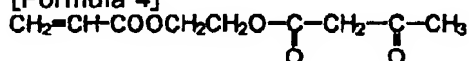
[0015]

[Formula 3]



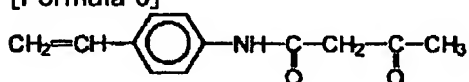
[0016]

[Formula 4]



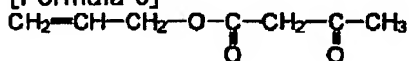
[0017]

[Formula 5]



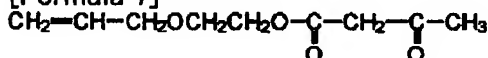
[0018]

[Formula 6]



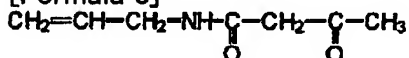
[0019]

[Formula 7]



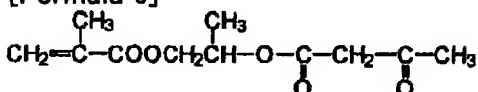
[0020]

[Formula 8]



[0021]

[Formula 9]



[0022] Although the functional group of \*\* 2 may be included independently, the polymer which has the functional group shown by \*\* 2 can be preferably performed, also when it is the polymer obtained by copolymerizing [ monomer / which has the functional group of \*\* 2 ] with this and other copolymerizable monomers. As an example of such a copolymerizable monomer Styrene, 4-methyl styrene, 4-hydroxystyrene, 4-carboxy styrene, Styrene derivatives, such as 4-amino styrene, chloro methyl styrene, and 4-methoxy styrene, A methyl methacrylate, ethyl methacrylate, methacrylic-acid butyl, methacrylic-acid hexyl, Alkyl methacrylate ester, such as 2-ethylhexyl methacrylate, cyclohexyl methacrylate, and methacrylic-acid dodecyl Methacrylic-acid aryl ester or alkyl aryl ester, such as methacrylic-acid phenyl and methacrylic-acid benzyl, Methacrylic-acid 2-hydroxyethyl, 2-hydroxypropyl methacrylate, Methacrylic-acid methoxy diethylene-glycol monoester, methacrylic-acid methoxy polyethylene-glycol monoester, The methacrylic ester which has alkyleneoxy radicals, such as methacrylic-acid polypropylene-glycol monoester Amino-group content methacrylic ester, such as methacrylic-acid 2-dimethylaminoethyl and a methacrylic-acid 2-diethylaminoethyl or the same example as the methacrylic ester which these-corresponds as acrylic ester -- or An acrylic acid, a methacrylic acid, a crotonic acid, a maleic acid, a fumaric acid, maleic-acid monoalkyl ester, amino-group content monomers, such as monomers which have a carboxy group like fumaric-acid monoalkyl ester, allylamine, and a diaryl amine, -- or A vinyl sulfonic acid and its salt, an allyl compound sulfonic acid and its salt, a metallyl sulfonic acid, and its salt, The monomers which have sulfonic groups, such as a styrene sulfonic acid and its salt, 2-acrylamido-2-methyl propane sulfonic acid, and its salt 4-vinylpyridine, 2-vinylpyridine, N-vinyl imidazole, As the monomers which have nitrogen-containing heterocycles, such as N-vinylcarbazole, or a monomer which has a quarternary-ammonium-salt

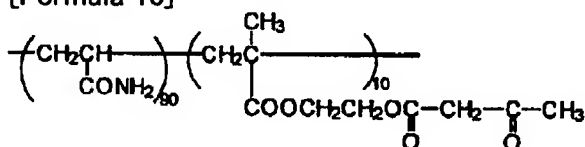
radical, 4-vinylbenzyl trimethylammonium chloride, Acryloyloxyethyl trimethylammonium chloride, methacryloyloxy-ethyl trimethylammonium chloride, The 4th class ghost by the methyl chloride of dimethylaminopropyl acrylamide, The 4th class ghost by the methyl chloride of N-vinyl imidazole, 4-vinylbenzyl pyridinium chloride, etc., Or acrylonitrile, a methacrylonitrile, and acrylamide, Methacrylamide, dimethyl acrylamide, diethyl acrylamide, N-isopropyl acrylamide, diacetone acrylamide, N-methylol acrylamide, Acrylamide or methacrylamide derivatives, such as N-methoxy ethyl acrylamide, Furthermore, acrylonitrile, a methacrylonitrile, vinyl acetate, chloroacetic-acid vinyl, Vinyl ester, such as propionic-acid vinyl, butanoic acid vinyl, stearin acid vinyl, and benzoic-acid vinyl Moreover, vinyl ether, such as the methyl vinyl ether and butyl vinyl ether In addition, N-vinyl pyrrolidone, acryloyl morpholine, tetrahydrofurfuryl methacrylate, Various monomers, such as a vinyl chloride, a vinylidene chloride, allyl alcohol, vinyltrimetoxysilane, and glycidyl methacrylate, can be suitably used as a copolymerization monomer.

[0023] It is desirable that they are below 99 weight sections, if the ratio of copolymer repeating units other than \*\* 2 which is contained in a copolymer in the case of the copolymer which has functional groups other than the functional group shown by \*\* 2 is a ratio beyond this, there are few rates of the functional group shown by \*\* 2 contained in a copolymer, and since the effectiveness does not show up, it is not desirable.

[0024] The desirable example of the polymer which has the functional group shown by-izing 2 the bottom like this is shown below.

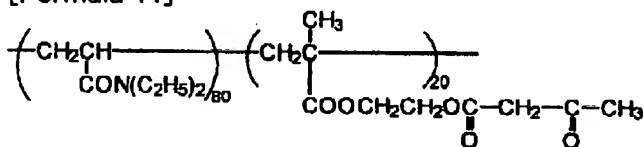
[0025]

[Formula 10]



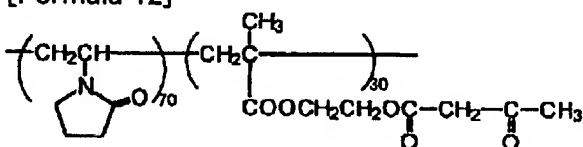
[0026]

[Formula 11]



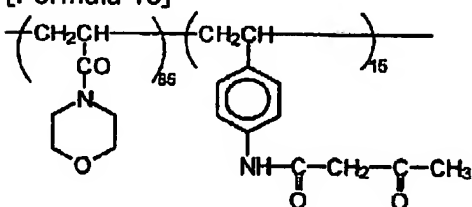
[0027]

[Formula 12]



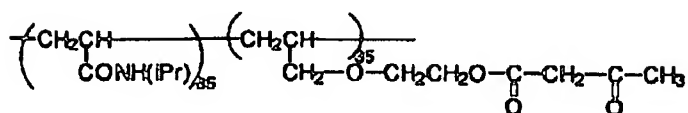
[0028]

[Formula 13]



[0029]

[Formula 14]



[0030] Forming the ink acceptance layer which contains independently the polymer which has the functional group shown by \*\* 2 may also demonstrate desirable ink absorptivity, while the cross linked polymer which addition between functional groups between the functional groups of \*\* 2 or other than \*\* 2 and a condensation reaction may arise, and is formed as a result, for example under a basic ambient atmosphere shows a good water resisting property. However, it is desirable to add a cross linking agent further in the semantics which constructs a bridge positively in the polymer which has the functional group shown by \*\* 2, and it is desirable to form the ink acceptance layer which an aldehyde mold cross linking agent or N-methylol mold cross linking agent is added to this polymer as such a cross linking agent, and crosslinking reaction is advanced on a base material, and consists of a bridge formation coat.

[0031] Formaldehyde, glyoxal, the Succin aldehyde, glutar DEHIDO, dialdehyde starch, the poly acrolein, etc. are mentioned, and low-molecular cross linking agents, such as a dimethylolurea, trimethylolmelamine, a dimethylol ethylene urea, a hexa methylol melamine, dimethylol alkyl triazon, methylation uronic dimethylol, a dimethylol hydroxy ethylene urea, a dimethylol propylene urea, and dimethylol carbamates, can be preferably used for an example desirable as an aldehyde mold cross linking agent as an N-methylol mold cross linking agent, for example.

[0032] Furthermore, when the cross linking agent of the amount of giant molecules which has N-methylol radical is used for a side chain like Pori (N-methylol acrylamide) as a giant-molecule type as a cross linking agent, it is in the inclination which increases compared with the case where the liquid adsorption of the bridge formation coat formed uses a low-molecular cross linking agent, and since the absorptance to ink may become higher, it can be used preferably.

[0033] Since the degree of cross linking of this polymer that forms an ink acceptance layer goes up too much and ink absorbing power falls notably when a cross linking agent is added in the amount which it is desirable not to exceed 30 weight sections as for the ratio of the cross linking agent to this polymer 100 weight section, and exceeds this when adding to the polymer which has the functional group shown by \*\* 2 in the above cross linking agents and forming an ink acceptance layer, it is not desirable.

[0034] The binder of other arbitration can be collectively used if needed with the polymer which has the functional group shown by \*\* 2. As such a binder, for example as a cellulosic, a carboxymethyl cellulose, Hydroxyethyl cellulose, hydroxypropylcellulose, methyl cellulose, The hydroxypropyl methylcellulose, diethylaminoethylcellulose, Diethyl ammonium chloride hydroxyethyl cellulose, hydroxypropyl trimethyl ammonium chloride hydroxyethyl cellulose, etc., Various denaturation starch, such as starch, cationic starch, and hydroxypropyl starch, As chitosan, a carrageenan, and gelatin, or acid-treatment gelatin, alkali treatment gelatin, To various derivatized gelatin and a pan, as vinyl polymer, polyvinyl alcohol, Various synthetic polymers, such as a polyvinyl acetal, a polyvinyl pyrrolidone, polyacrylamide, sodium polyacrylate, and a polyvinyl-pyrrolidone-vinyl acetate copolymer, can be used. When using together with the polymer which has the functional group shown by \*\* 2 in such a binder, especially a limit does not have the addition of a binder, but it may not be [ that effectiveness of this invention cannot show up easily ] desirable when a binder is used exceeding an amount as opposed to the polymer which has the functional group of \*\* 2 100 times.

[0035] When gelatin is used also especially among the above-mentioned binders, it is possible to form the structure of cross linkage because the functional group shown by \*\* 2 combines with gelatin effectively, and it is very desirable when forming an ink acceptance layer with a water resisting property. Furthermore, the desirable property that stickiness or blocking of the printing section which performed ink jet record cannot take place easily as a merit which uses gelatin together can be given.

[0036] If moisture diffuses a record image and it evaporates after printing when the color material in the ink printed further is a pigment distribution object, although the water resisting property of the ink jet recorded material itself is attained by forming the ink acceptance layer formed into the bridge formation deck watertight luminaire as mentioned above on a base material, the water resisting

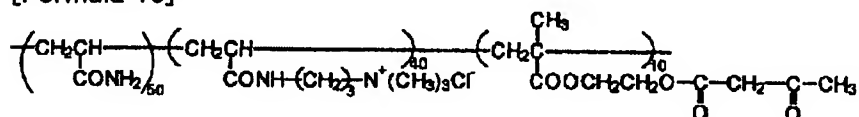


property of image oneself and others is discovered, but when the color material in ink is water soluble dye in one side, the water resisting property of the image section may not be enough. In such a case, it was found out that it is very desirable that the polymer which has various quaternary-ammonium-salt radicals or a phosphonium salt radical is included in an ink acceptance layer as a means for combining water soluble dye in an ink jet recorded material.

[0037] As a polymer which has a quaternary-ammonium-salt radical or a phosphonium salt radical, the case where it has the functional group shown by \*\* 2 in the same polymer is desirable, and one is that such the 4th class base is included in the polymer which constructed the bridge, water soluble dye joins together in the case of ink jet record, and in a recording layer, immobilization and since it is deck-watertight-luminaire-ized, it is very desirable. Although a polymer as shown in \*\* 15 —izing 20 can be mentioned as a desirable example of such a polymer, it is not limited to these.

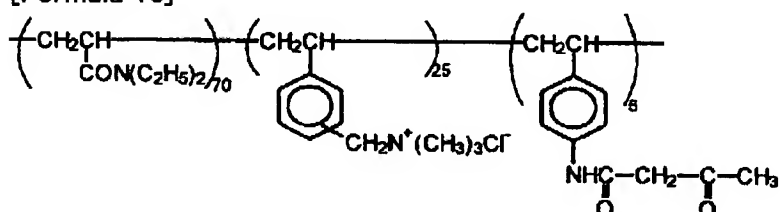
[0038]

[Formula 15]



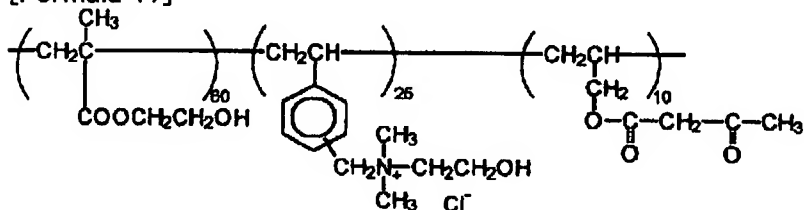
[0039]

[Formula 16]



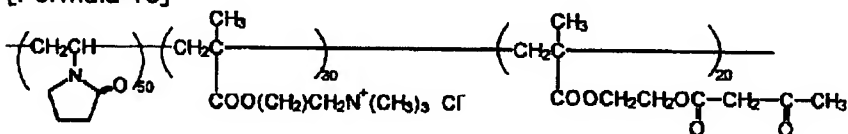
[0040]

[Formula 17]



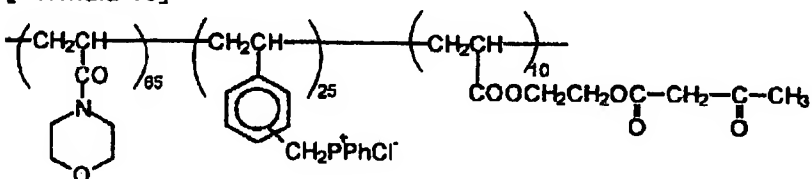
[0041]

[Formula 18]



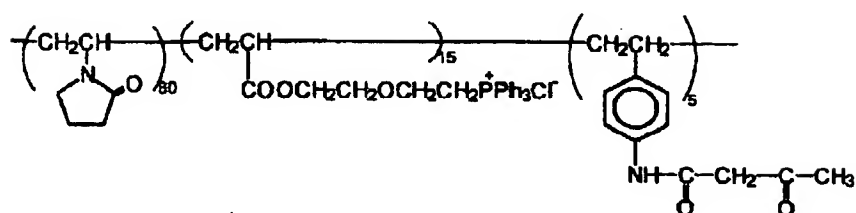
[0042]

[Formula 19]



[0043]

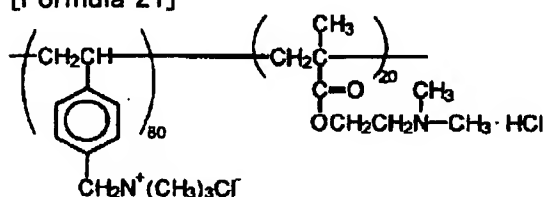
[Formula 20]



[0044] Blending to the polymer which has the functional group shown by \*\* 2 in the polymer which has the same 4th class base as one of the policies for raising the water resisting property of a record image similarly in the ink jet record in the ink containing water soluble dye, and forming an ink acceptance layer is also performed preferably. Although an example as shown in following \*\* 21 — izing 24 as an example of such a polymer that can be blended and used is given, it is not limited to these.

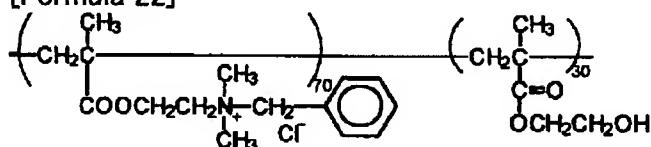
[0045]

[Formula 21]



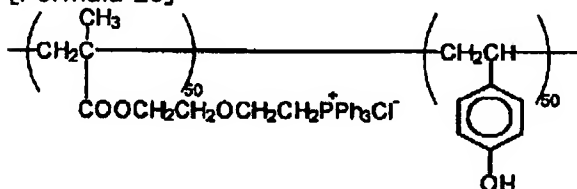
[0046]

[Formula 22]



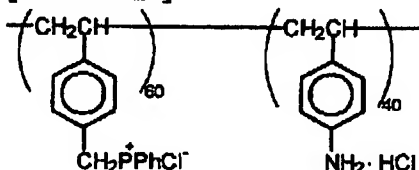
[0047]

[Formula 23]



[0048]

[Formula 24]



[0049] About the ratio of each polymer in the case of blending the polymer which has the 4th class salts of various kinds of as shown in the above-mentioned example, and forming an ink acceptance layer, as for the 4th class salt polymer, it is desirable to blend at a rate below 50 weight sections in [ all ] the polymer 100 weight section, and when it adds by the ratio exceeding this, the water resisting property of the polymerization body skin film which forms an ink acceptance layer falls and is not desirable [ a polymer ].

[0050] When sinking in or applying to a base material the polymer which has the functional group shown by \*\* 2, as an amount of the polymer needed in order to demonstrate the target effectiveness

Extent of 0.1g or more per surface area of 1 square meter of base material 20g or less is desirable, and when it is used in the amount below this range, even if it is hard to accept the effectiveness which added the polymer and uses it exceeding 20g, it is only that a superfluous polymer exists and is not desirable.

[0051] With the polymer shown by \*\* 2, it is also possible synthetic particle silicas, such as an inorganic ultrafine particle dispersing element still like colloidal silica and alumina sol, and titanium oxide, a zinc oxide, a calcium carbonate or amorphous silica, an amorphous silica, and to use together polymer particles, such as various synthetic latexes, and polystyrene beads, a polymethylmethacrylate bead, etc. for the various purpose, such as improvement, whenever [ blocking prevention, surface treatment, and concealment ] further.

[0052] or [ stopping use of pigment components, such as inorganic / which the ink acceptance layer was constituted mainly from a binder when surface gloss was required like for example, the color paper for photographs as an ink jet recorded material, and was described previously /, and an organic particle, to the minimum ] -- or it is desirable not to use it. In such a case, the ink absorption capacity of the ink acceptance layer which mainly consists of binders is enough, and it is required that rate of absorption should be [ the printing side ] dry immediately after printing early. Furthermore, it is required practically that it should have the property of ink not imprinting even if the color of the printed part has a water resisting property and traces a printing side with a finger immediately after printing.

[0053] It is the description that addition of other pigments, a binder, etc. is not needed fundamentally, but ink jet record of sufficient quality can be performed by this ink acceptance layer independent from having good ink absorptivity ability although the ink acceptance layer which consists of polymers obtained by this invention is constructing the bridge. When a bridge is not being constructed, that a water resisting property is not shown has an obvious ink acceptance layer.

[0054] The synthetic example 1 (synthetic example of \*\* 10)

10g of monomers and 90g of acrylamides shown by \*\* 3 were introduced in 1l. 4 opening flask equipped with an agitator, a thermometer, a ring current cooling pipe, and nitrogen installation tubing, and 200g of water and 100g of ethanol were added, it was on [ of 70 degrees C ] the water bath, and it stirred, introducing nitrogen gas. As an initiator, the polymerization was started by supplying 1g (2,4-dimethylvaleronitrile) (V-65, product made from the Wako Pure Chem industry) of 2 and 2'-azobis, heating stirring was performed for 6 hours, and the polymer solution was obtained.

[0055] The synthetic example 2 (synthetic example of \*\* 17)

N and N-dimethyl compounded from 10g [ of monomers ] and 65g of hydroxyethyl methacrylate and m, and p-chloro methyl styrene, and dimethylamino ethanol (2-hydroxyethyl) - 25g of m and p-vinylbenzyl ammoniumchloride grams was introduced, and 200g of water and 100g of ethanol were added, it was on [ of 70 degrees C ] the water bath and it stirred, introducing nitrogen gas. [ which be shown by \*\* 4 in 1l. 4 opening flask equipped with an agitator, a thermometer, a ring current cooling pipe and nitrogen installation tubing ] As an initiator, the polymerization was started by supplying 1g (2,4-dimethylvaleronitrile) (V-65, product made from the Wako Pure Chem industry) of 2 and 2'-azobis, heating stirring was performed for 6 hours, and the polymer solution was obtained.

[0056]

[Example]

The coating liquid whose solid content concentration is 12 % of the weight was created by combination shown in example 1 table 1, after having used the doctor bar in in the paper [ Hara ] for photographs the front face was covered with polyethylene, having carried out coating so that the amount of humid coating might be set to 100g/m<sup>2</sup>, and drying with a 70-degree C warm air dryer, it saved within the 40-degree C dryer one whole day and night, and the record sheet was created. Moreover, by the same approach, the record sheet for a comparison created by combination shown as a comparison sample in Table 2 was created, respectively. the obtained record sheet -- A4 size -- judging -- as an ink jet printer -- canon company make -- it printed using BJC-600J and evaluated about the following item.

(1) Quality of printed character : in the continuous tone pattern of the 2cm angle which consisted of monochrome and color mixture, it evaluated whether ink concentration would be uniform. The case where a pattern was drawn by uniform concentration in the whole surface product which printed was

made into O, the case where unevenness was in printing concentration partially was made into \*\*, and the case where printing nonuniformity was further generated over the whole surface was made into x.

(2) Ink absorptivity : it evaluated whether the above-mentioned printing pattern would be printed, a PPC form would be pressed against a printing side after printing, and the imprint of ink would arise. The case where the imprint of the ink to a PPC form did not take place immediately after printing was made into O, and just behind after printing, although some imprint arose, even if it made into O the case where an imprint would not take place within several minutes, it made into \*\* the case where an imprint would not take place within 10 minutes more than for several minutes and more than it passed, the case where the imprint of ink took place was made into x.

(3) Ink fixable : after printing the above-mentioned printing pattern, waterdrop was dropped on the printing section and left for 10 minutes. When waterdrop was wiped off, while outflow and image concentration fell [ the color of the printing section ], the case where ink spread around the printing section was made into x, a color was not eluted conversely, but the case where the breadth of the ink to the image section circumference was not produced, either was made into O, and both middle was made into \*\*.

(4) Water resisting property: After printing the above-mentioned printing pattern, the record sheet was dipped into 40-degree C warm water, and was left for 30 minutes. Even after the printing section or one of the non-printing sections also made x the case where it dissolved or dropped out of a base material and were immersed, the case where it was uninfluential in any way was made into O, and the case where the dissolution etc. arose partially was made into \*\*.

(5) Bottom shelf life of highly humid : the sample was saved for one week under the ambient atmosphere of 30 degrees C and 85% relative humidity after printing the above-mentioned printing pattern. The breadth of the printing pattern by diffusion of a color made x the case where generating or blocking occurred, both blocking and diffusion of a color made \*\* the case of being slight, and it made O the case where it was uninfluential in any way. The middle of \*\* and O was made into O.

(6) lightfastness: the sheet which printed the above-mentioned printing pattern -- the interior of a room under a fluorescent lamp exposure -- one week -- leaving it -- fading [ of the printing section ], and yellowing of the non-printing section -- color matching tone change and concentration change were measured. Making into x the case where yellowing of a remarkable color tone change or fading, and the printing section etc. was seen, some concentration change made O the case where change of the color tone itself is slight, or change is not accepted although it accepts, and yellowing was not accepted in the non-printing section, and made both middle \*\*. Evaluation continued further about the thing of O, it was left for one week in the interior of a room under a fluorescent lamp exposure, the case where change was not accepted was made into O, and except [ its ] was made into O.

(7) Glossiness: About the sheet which printed the above-mentioned printing pattern, in both the non-printing section and the printing section, gloss made the good thing O, what is inferior in gloss in both was made into x, and both middle was made into \*\*.

[0057] Based on the above-mentioned valuation basis, the result of having evaluated the record sheet created by combination of Table 1 and 2 was summarized in Table 3.

[0058]

[Table 1]

試料	重合体	他のバインダー	架橋剤
1	化10(80)	ゼラチン(20)	無し
2	化10(100)	無し	ホルマリン
3	化11(100)	無し	グリセロール
4	化12(100)	無し	トリメチロール尿素(5)
5	化13(100)	無し	ポリ(N-メチロールアクリルアミド)(3)
6	化14(100)	無し	ジメチロール尿素(5)
7	化15(100)	無し	ポリ(N-メチロールアクリルアミド)(10)
8	化16(100)	無し	"(5)
9	化17(100)	無し	"(2)
10	化18(100)	無し	"(2)
11	化18(70)	ゼラチン(30)	無し
12	化19(100)	無し	ホルマリン(3)
13	化20(100)	無し	"(2)
14	化20(70)	ゼラチン(30)	無し
15	化20(70)	ゼラチン(30)	ジメチロール尿素(5)
16	化10(80)	化21(20)	ホルマリン(3)
17	化11(65)	化22(35)	"(5)
18	化12(70)	化24(30)	"(5)
19	化13(75)+化19(25)	無し	"(2)

[0059] The numeric value in table 1 brace expresses the weight section. By making all polymers into the 100 weight sections, coating liquid was created so that this might become 10 % of the weight.

[0060]

[Table 2]

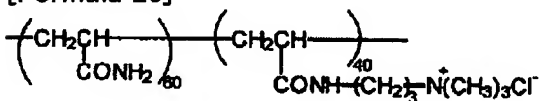
比較試料として下記の配合に基づく塗工液を作成し同様に記録シートを作成した。

比較試料	比較の重合体	他のバインダー	架橋剤
1	化25(100)	無し	無し
2	化25(80)	ゼラチン(20)	無し
3	化26(100)	無し	無し
4	化26(70)	化22(30)	無し
5	化26(70)	化22(30)	ホルマリン(5)

[0061] The numeric value in a front brace expresses the weight section. All polymers were made into the 100 weight sections, coating liquid was created, it applied and dried similarly, and the record sheet was created so that solid content concentration might become 10 % of the weight.

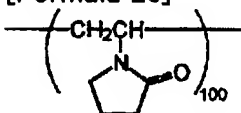
[0062]

[Formula 25]



[0063]

[Formula 26]



[0064]

[Table 3]

試料	評価項目						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
1	△	△	○	○	△	△	○
2	○	○	○	○	△	○	○
3	○	○	○	○	△	○	○
4	○	○	○	○	△	○	○
5	○	○	○	○	△	○	○
6	○	○	○	○	△	○	○
7	○	⊗	○	○	○	○	○
8	○	⊗	○	○	○	○	○
9	○	⊗	○	○	○	○	○
10	○	⊗	○	○	○	○	○
11	△	△	○	○	△	○	○
12	○	⊗	○	○	⊗	○	○
13	○	⊗	○	○	⊗	○	○
14	○	⊗	○	○	⊗	⊗	○
15	○	⊗	○	○	⊗	⊗	○
16	○	○	○	○	⊗	○	○
17	○	○	○	○	⊗	○	○
18	○	○	○	○	⊗	○	○
19	○	⊗	○	○	○	⊗	○
比較 1	x	x	x	x	x	○	○
比較 2	x	x	△	△	x	○	○
比較 3	x	x	△	△	x	○	○
比較 4	△	△	x	△	x	x	x
比較 5	△	△	x	△	x	x	x

[0065] The example 2 composition amorphous silica (Tokuyama fine seal X-37B) 20 section is distributed using the water 80 section. To this, the polyvinyl alcohol (Kuraray PVA117) 10% solution 70 section of 97% of saponification degrees, The 2 sections (the Nippon Soda cay call BBL, 50% of active principles) of fluorescent brighteners are added. Furthermore, 10% solution (combination was shown in the following table 4) of the polymer solution concerning this invention or a comparison compound is used as the 30 sections, in addition coating liquid. This was applied so that it might become the about two about 150 g/m amount of humid coating in the Hara paper of basis-weight 92 g/m<sup>2</sup> using a wire bar, and ink jet recorded media were created by carrying out calender processing one front flesh side at a time in linear pressure 49 N/cm after desiccation in an air forced oven. Printing evaluation which used the ink jet printer was performed completely like the example 1. It changed to (7) glossiness in an example 1 among evaluation criteria, and (7) coated-layer reinforcement was evaluated. When having stuck a Scotch tape, having torn off on the front face after printing about coated layer reinforcement and an image was not affected, the case where O and a coated layer were torn off was made into x, and the case where it peeled also partially was made into \*\*.

[0066] Based on the above-mentioned valuation basis, the result of having evaluated the record sheet created from the configuration of Table 4 was summarized in Table 5. In the above-mentioned formula, 30 \*\*\*\*\* coating liquid was used for the solution prepared so that the whole solid content concentration might become 10% of the weight with the configuration of Table 4. The figure in the parenthesis in Table 4 expresses the weight section.

[0067]

[Table 4]

試料	重合体	他の重合体	架橋剤
1	化1 1 (100)	無し	無し
2	化1 1 (70)	化2 1 (30)	無し
3	化1 2 (100)	無し	無し
4	化1 2 (70)	化2 4 (30)	無し
5	化1 3 (70)	化2 1 (30)	無し
6	化1 4 (70)	化2 5 (30)	無し
7	化1 5 (100)	無し	無し
8	化1 7 (100)	無し	無し
9	化1 8 (100)	無し	無し
10	化1 9 (100)	無し	無し
11	化2 0 (100)	無し	無し
12	化2 0 (100)	無し	ポリ(N-メチル-2-ピコリブチルアミン) (2)
13	化2 0 (100)	無し	ポリ(N-メチル-2-ピコリブチルアミン) (10)
比較1	化2 5 (100)	無し	無し
比較2	化2 5 (70)	化2 1 (30)	無し
比較3	化2 6 (70)	化2 2 (30)	ポリ(2) (3)

[0068]

[Table 5]

試料	(1)	(2)	(3)	評価項目 (4)	(5)	(6)	(7)
1	○	○	○	○	○	○	○
2	○	○	○	○	○	○	○
3	○	○	○	○	○	○	○
4	○	○	○	○	○	○	○
5	○	○	○	○	○	○	○
6	○	○	○	○	○	○	○
7	○	○	○	○	○	○	○
8	○	○	○	○	○	○	○
9	○	○	○	○	○	○	○
10	○	○	○	○	○	○	○
11	○	○	○	○	○	○	○
12	○	○	○	○	○	○	○
13	○	○	○	○	○	○	○
比較1	△	×	×	△	×	○	×
比較2	△	×	△	△	△	○	△
比較3	△	△	×	△	△	△	△

[0069]

[Effect of the Invention] The recorded material for ink jet record with the water resisting property which was excellent in the good gloss and the shelf life of a quality of printed character with this invention is obtained.

[Translation done.]